

REMARKS

This amendment is responsive to the Office action dated July 26, 2002. Claims 26-29, 31-37, and 41-45 are pending in the application. Claims 26 and 42-44 have been rejected under 35 U.S.C. § 112, first paragraph. Claims 26-29, 31-37 and 41-45 have been rejected under 35 U.S.C. § 112, second paragraph. All of the pending claims have been rejected under 35 U.S.C. § 102 and/or 103 in view of U.S. Patent No. 5,741,462 to Nova et al. and/or U.S. Patent No. 6,114,038 to Castro et al. In response, applicants have amended several of the claims, to more clearly recite the claimed invention, and prepared the following remarks, which indicate why the claims are neither anticipated by nor obvious in view of the cited references. Accordingly, applicants respectfully request reconsideration of the application and allowance of the pending claims.

Claim Objections

The Examiner objected to claim 36, stating that it appeared that the word “a” was missing before the phrase “confocal optics structure.” Applicants have amended the claim to insert “a” before “confocal.”

Claim Rejections – 35 U.S.C. § 112, first paragraph

The Examiner rejected claims 26 and 42-44 under 35 U.S.C. § 112, first paragraph. Applicants respond, as indicated below.

A. Claim 26

Claim 26 refers to at least two carriers that are “arbitrarily” distributed on a surface. The Examiner stated that he did not find support for the term “arbitrary” in the specification, but that he did find support for the term “random.” Although the term

“arbitrary” is not literally present in the specification, applicants disagree that the term lacks support under § 112, first paragraph. The specification discloses numerous examples of assays in which carriers are distributed on a surface with no particular positional pattern or locational order between the carriers. Nevertheless, to expedite prosecution of the application, applicants have replaced the term “arbitrary” with the term “random” in claim 26, which should be interpreted in view of the specification to mean that the carriers do not have assigned positions relative to each other. This change is merely an interchange between equivalents and has no substantive affect on patentability or claim scope.

B. Claims 42-44

Claims 42-44 refer to an “analyte area” and a “code display area.” The Examiner stated that the specification does not support these terms. Applicants disagree. Indeed, on page 4 of the Office action, in paragraph (I), the Examiner stated that an “analyte area” and a “code display area” would be “inherent” from the subject matter of claim 26. Limitations that are inherent to originally supported disclosure should not be rejected under § 112, first paragraph. Moreover, with respect to claims 43 and 44, which recite specific relationships between the analyte area and the code display area, applicants direct the Examiner’s attention to carrier configurations shown in Figures 10 and 11, in which a code configuration spans the entire surface of the carrier. A person of ordinary skill in the art would assume that any analyte attachment with these carriers necessarily would result in some overlap between the analyte area and the code display area, and that the two areas may substantially coincide. Nevertheless, to expedite prosecution of the

application, applicants have canceled these claims, reserving their right to pursue the claims in a subsequent continuation application.

Claim Rejections – 35 U.S.C. § 112, second paragraph

The Examiner rejected claims 26-29, 31-37, and 41-45 under 35 U.S.C. § 112, second paragraph. Applicants respond, as indicated below.

A. Claim 26

The Examiner stated that it is unclear in claim 26 whether the term “arbitrarily” is intended to mean “randomly.” Applicants addressed this point above.

B. Claim 26

The Examiner stated that the phrase “distributed on the surface” in claim 26 is not clear. Specifically, the Examiner said that it is unclear whether the carriers are attached to the surface by covalent or noncovalent interactions, if the carriers are placed within wells, if the carriers are merely in contact with the surface and held in place by gravity, if the carriers can all be in a test tube, or if the carriers can be in motion and passed along the surface. There are no limitations in claim 26 that would limit the type of interaction between analytes and the surface. Microsoft Bookshelf '95 defines “distribute” as follows: “to spread or diffuse over an area.” Thus, the terms in the claim mean that the carriers are spread out over the surface, without any limitation as to the context or environment of the surface, or to any particular type of bonding, attachment, or other interaction (if any) between the carrier and the surface.

C. Claims 26-29, 31-37, and 41-45

The Examiner states that it is unclear in claims 26-29, 31-37, and 41-45 what statutory class of invention applicants are seeking to patent. The Examiner has not set forth a ground of rejection recognized under the second paragraph of section 112. There is no allegation, for example, that one of ordinary skill would find the scope of the claimed invention unclear. Whether “an array device” is a statutory class of invention, such as an apparatus or composition, is irrelevant under section 112 as long as one of ordinary skill can determine what infringes.¹

The “array device” language was in the claims as originally submitted. In response to a restriction requirement, applicants replaced “device” with “system.” The Examiner objected to this amendment in a communication stating that the amendment was nonresponsive to the restriction requirement. Applicants believe that the preambles of the pending claims are satisfactory, but would be willing to replace “device” with another equivalent term, such as “system,” if the Examiner would prefer.

D. Claim 29

The Examiner stated that the term “optically identifiable marks” in claim 29 is not clear, contending that it is unclear whether the “marks” could originate from the same physical space in a carrier. A person of ordinary skill in the art reading the claim in view of the specification would understand that there is no limitation in the claim that would

¹ Applicants are unaware of any law or rule that requires a specific term such as “apparatus” or “composition” in the preamble. Clearly, the claims are directed to statutory subject matter under 35 U.S.C. § 101. The Examiner apparently agrees because there is no rejection under 35 U.S.C. § 101 in the Office action.

prevent the claim from reading on a carrier in which multiple marks originate from the same physical space.

E. Claim 30

The Examiner stated that the metes and bounds of “fiber optic components” in claim 30 are not clear. To expedite prosecution of the application, and without conceding the merits of the objection, applicants have amended the claim to replace “fiber optic components” with the equivalent phrase “fused glass fibers.” This amendment is supported by Figure 11, and by text on page 19, lines 6-10. No change in scope is occasioned by this amendment.

F. Claim 31

The Examiner stated that the phrase “the carriers include nanocrystals” in claim 31 could be interpreted to mean that some of the carriers are nanocrystals and some are not, or that all of the carriers contain nanocrystals. The term “include” is open. Therefore, a person of ordinary skill in the art would interpret claim 31 in view of the specification to mean that there are some nanocrystals in at least some of the carriers. However, to clarify the meaning of the term “include,” applicants have replaced “include” with the equivalent term “comprise” in this claim.

G. Claim 34

The Examiner stated that the term “digital image” in claim 34 lacks antecedent basis. Applicants have amended this claim to delete the term “digital.”

H. Claims 35 and 36

The Examiner asked for clarification of the term “includes” in claims 35 and 36. The term “includes” is open. Accordingly, the imaging device may have other structures in addition to a microscope, relative to claim 35, or confocal optics structure, relative to claim 36. However, to clarify the meaning of the term “includes,” applicants have replaced “includes” with the equivalent term “comprises” in claims 35 and 36. In addition, applicants have replaced “includes” with “comprises” at every other occurrence of this term in the claims (claims 27, 29, and 40).

I. Claim 42

The Examiner stated that the terms “analyte area” and “code display area” in claim 42 are unclear, but that these terms are inherent to the subject matter of claim 26. The rejection is moot in view of applicants’ cancellation of claim 42.

Claim Rejections – 35 U.S.C. § 102

The Examiner rejected claims 26-29, 31, 32, 35, 37, and 41-45 under 35 U.S.C. § 102(e) as being anticipated by Nova and/or Castro. Applicants respectfully traverse the rejection. Neither reference teaches nor suggests all of the limitations in the rejected claims, as required for anticipation.

A. Claims 26-29, 32, and 41-45

The Examiner rejected claims 26-29, 32, and 41-45 under 35 U.S.C. § 102(e) as being anticipated by Nova. These claims, which each include the limitations of independent claim 26, recite in part (i) a mixture of at least two carriers randomly distributed on a surface, each of the at least two carriers having an optically detectable

code that distinguishes it from the other carrier, (ii) an imaging device configured to acquire at least one image of the mixture, and (iii) an image analysis system that uses code information from the image to interpret experiments on the analytes. In contrast, Nova neither teaches nor suggests any type of system that acquires an image of a heterogeneous mixture of coded carriers distributed on a surface in combination with an analysis system that uses code information from the image to interpret experiments. Thus, applicants' claimed system is fundamentally different from Nova's because it is designed to detect information from differently coded carriers on a surface in parallel. In contrast, Nova's analysis system involves reading and/or writing information on particles in series, i.e., one at a time (see, e.g., Nova, Figure 7 and column 25, lines 8-31). Moreover, Nova's main focus is on the use of radio frequency signals to read and write information on particles. Such particles may not be easily adapted to a system that detects information from a heterogeneous mixture of particles on a surface in parallel. Thus, for at least these reasons, claims 26-29, 32, and 41-45 are not anticipated by Nova and should be allowed.

B. Claims 26-28, 31, 32, 35, 37, and 41-44

The Examiner rejected claims 26-28, 31, 32, 35, 37, and 41-44 under 35 U.S.C. § 102(e) as being anticipated by Castro. Applicants disagree. These claims, which each include the limitations of independent claim 26, are not anticipated by Castro for reasons that are similar to those expressed above with respect to Nova. For example, Castro fails to teach or suggest a system that acquires an image of a heterogeneous mixture of coded carriers distributed on a surface in combination with an analysis system that uses code

information from the image to interpret experiments. The Examiner stated that Castro discloses the placement of a mixture containing cells and ligand-coated nanocrystals onto a glass slide (citing column 14, lines 1-26). However, the cited example does not include a “mixture” as recited in applicants’ claim 26. Specifically, claim 26 states that the mixture has at least two carriers, each carrier having an optically detectable code that distinguishes it from the other carrier. In contrast, in Castro’s example, WGA-labeled, functionalized nanocrystals are used as a water-soluble fluorescent stain to view cell aggregation. These nanocrystals would not be considered a “carrier,” as recited in the claims. Thus, for at least these reasons, claims 26-28, 31, 32, 35, 37, and 41-44 are not anticipated by Castro and should be allowed.

Claim Rejections – 35 U.S.C. § 103

The Examiner rejected claims 26-29, 31-37, and 41-45 under 35 U.S.C. § 103(a) as being unpatentable over Nova and/or Castro. In both instances, the Examiner acknowledges that the references fail to disclose use of a CCD camera or microscope with confocal optics. Applicants contend that claim 26 and all pending dependent claims are nonobvious over Nova and Castro because it would not have been obvious to a person of ordinary skill in the art to provide a system in which an imaging device acquires an image of a heterogeneous mixture of coded carriers on a surface, and then uses code information from the image to interpret experiments on analytes carried by the carriers. The Examiner says it would have been obvious in view of Nova to use a CCD camera or a microscope having confocal optics. However, without conceding the Examiner’s point,

even if it were true, Nova still fails to teach or suggest the concept of distributing a heterogeneous mixture of coded particles randomly over a surface and acquiring an image of the mixture. None of the references of record, including Nova and Castro, alone, or in any combination, teaches or suggests this concept. Therefore, all of the pending claims are patentable and in condition for allowance.

New Claims

Applicants have added new claims 54-59. Each of these claims is fully supported by the application.

Claim 54 depends from independent claim 26 and recites “wherein the analyte is a cell.” This limitation is supported by the application, for example, in Figure 7 and on page 18, lines 3-14.

New independent claim 55 is directed to an array device. The array device requires a mixture of at least two carriers disposed on a surface. Each of the at least two carriers is formed of fused glass fibers and has an optically detectable code. The references of record neither teach nor suggest carriers formed of fused glass fibers. Accordingly, claim 55 and claims 56-59, which depend from claim 55, are patentable over the art of record and should be allowed.


Conclusion

Applicants have responded to all of the points raised in the Office action and believe that the application is in condition for allowance. Please contact applicant’s attorney if there are any other issues to address. Applicants would welcome an

opportunity to conduct an interview in person with the examiner to discuss the merits of the application.

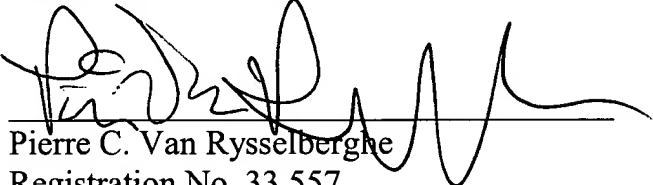
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Pamela A. Knight
Date of Signature: January 23, 2003

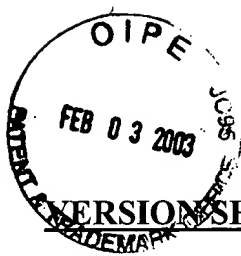
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VERSION SHOWING MARKINGS OF CHANGES BEING MADE

The claims have been amended as follows (material to be inserted is in **bold and underline**, material to be deleted is in ~~[brackets and strikeout]~~):

26. (Twice Amended) An array device comprising
- (a) **an examination site having** a surface,
 - (b) a **mixture** ~~[set]~~ of at least two carriers **randomly distributed on the surface**, each of the at least two carriers having an optically detectable code that distinguishes it from the other carrier, and each of the at least two carriers carrying an analyte that is identifiable by the respective code on the carrier, ~~[the at least two carriers being arbitrarily distributed on the surface,]~~
 - (c) an imaging device configured to acquire at least one image of **the mixture** ~~[an examination site on the surface, both of the at least two carriers being viewable in the at least one image]~~, and
 - (d) an image analysis system that uses code information from the image to interpret experiments on the analytes.

27. (Twice Amended) The device of claim 26, wherein the **mixture** ~~[set]~~ **comprises** ~~[includes]~~ three or more distinctively coded carriers.

29. (Twice Amended) The device of claim 28, wherein the colored code comprises [~~includes~~] at least two distinct colored optically identifiable marks.

30. (Twice Amended) The device of claim 26, wherein the carriers are formed from fused glass fibers [~~fiber-optic components~~].

31. (Twice Amended) The device of claim 26, wherein the carriers comprise [~~include~~] nanocrystals.

34. (Twice Amended) The device of claim 26, wherein the imaging device uses a CCD camera device to acquire the at least one [~~digital~~] image.

35. (Twice Amended) The device of claim 26, wherein the imaging device comprises [~~includes~~] a microscope.

36. (Twice Amended) The device of claim 26, wherein the imaging device comprises [~~includes~~] a confocal optics structure.

40. (Twice Amended) The device of claim 26, wherein the code on each of the at least two carriers comprises [~~includes~~] a distinctive spatial arrangement of optically identifiable marks.